

WHAT IS CLAIMED IS:

1. A vibration type brushless motor in a structure of brushless motor having an outer rotor type core comprising:

a rotor yoke;

a shaft of which one end is held by a bearing member so as to rotate freely and another end is fixed to a center of rotation of the rotor yoke;

a magnet in an arc; and

a ring core arranged around the shaft,

the rotor yoke having a side section being formed in a shape of which a part is cut off radially to the outer circumference direction from the center of rotation of the rotor yoke fixed with the other end of the shaft, wherein the ring magnet is fixed to the side section of the rotor yoke with facing the ring core,

the vibration type brushless motor is further characterized in that vibration is generated by unbalanced vibration of the rotor yoke.

2. A vibration type brushless motor in a structure of brushless motor having an outer rotor type core comprising:

a rotor yoke;

a shaft of which one end is held by a bearing member so as to rotate freely and another end is fixed to a center of rotation of the rotor yoke;

a magnet in an arc; and

a ring core arranged around the shaft,

the rotor yoke having a ceiling section formed in a disc shape

with centering the center of rotation of the rotor yoke fixed with the other end of the shaft and a side section connecting with an outer circumference edge of the ceiling section, wherein a part of the side section is cut off in a circular arc, and wherein the ring magnet is fixed to the side section of the rotor yoke with facing the ring core,

the vibration type brushless motor is further characterized in that vibration is generated by unbalanced vibration of the rotor yoke.

3. A vibration type brushless motor in a structure of brushless motor having an outer rotor type core comprising:

a rotor yoke;

a shaft of which one end is held by a bearing member so as to rotate freely and another end is fixed to a center of rotation of the rotor yoke;

a magnet in an arc; and

a ring core arranged around the shaft,

the rotor yoke having a ceiling section formed in a disc shape with centering the center of rotation of the rotor yoke fixed with the other end of the shaft and a side section connecting with an outer circumference edge of the ceiling section, wherein a part of the ceiling section is cut off radially to an outer circumference direction from the center of rotation of the rotor yoke, and wherein the ring magnet is fixed to the side section of the rotor yoke with facing the ring core,

the vibration type brushless motor is further characterized in that vibration is generated by unbalanced vibration of the rotor

yoke.

4. The vibration type brushless motor in accordance with claim 1, wherein the magnet is magnetized in  $2n$  magnetic poles with arranging the N and S magnetic poles alternately in one of a whole area and a part area of the magnet, where "n" is the positive integer.

5. The vibration type brushless motor in accordance with claim 2, wherein the magnet is magnetized in  $2n$  magnetic poles with arranging the N and S magnetic poles alternately in one of a whole area and a part area of the magnet, where "n" is the positive integer.

6. The vibration type brushless motor in accordance with claim 3, wherein the magnet is magnetized in  $2n$  magnetic poles with arranging the N and S magnetic poles alternately in one of a whole area and a part area of the magnet, where "n" is the positive integer.

7. A vibration type brushless motor in a structure of an axial gap type brushless motor comprising:

a rotor composed of a rotor yoke having a ceiling section, a magnet fixed to the rotor yoke and a shaft of which one end of the shaft is fixed to a center of rotation of the rotor yoke and another end of the shaft is held by a bearing member so as to rotate freely; and

a plurality of air-core coils arranged in a ring around the

bearing member,

the magnet in one shape out of a circular arc of which a part is cut off radially to an outer circumference direction from the center of rotation of the rotor yoke and a disc of which a part is cut off a part of the magnet, wherein the ring magnet is arranged to face the plurality of air-core coils,

the vibration type brushless motor is further characterized in that vibration is generated by unbalanced vibration of the rotor.

8. The vibration type brushless motor in accordance with claim 7, wherein the ceiling section of the rotor yoke is cut off radially to the outer circumference direction from the center of rotation of the rotor yoke.

9. A vibration type brushless motor in a structure of an axial gap type brushless motor comprising:

a rotor composed of a rotor yoke having a ceiling section, a magnet fixed to the rotor yoke and a shaft, wherein one end of the shaft is fixed to a center of rotation of the rotor yoke and another end of the shaft is held by a bearing member so as to rotate freely; and

a plurality of air-core coils arranged in a ring around the bearing member,

the magnet in a disc shape having a hollow section in an approximate circle being provided so as to surround the center of rotation, wherein the magnet has a center being shifted from the center of rotation of the rotor yoke and is arranged to face the plurality of air-core coils,

the vibration type brushless motor is further characterized in that vibration is generated by unbalanced vibration of the rotor caused by the shifted center of the hollow section with respect to the center of rotation of the rotor yoke.

10. The vibration type brushless motor in accordance with claim 7, wherein the magnet is magnetized in  $2n$  magnetic poles with arranging the N and S magnetic poles alternately in one of a whole area and a part area of the magnet, where "n" is the positive integer.

11. The vibration type brushless motor in accordance with claim 8, wherein the magnet is magnetized in  $2n$  magnetic poles with arranging the N and S magnetic poles alternately in one of a whole area and a part area of the magnet, where "n" is the positive integer.

12. The vibration type brushless motor in accordance with claim 9, wherein the magnet is magnetized in  $2n$  magnetic poles with arranging the N and S magnetic poles alternately in one of a whole area and a part area of the magnet, where "n" is the positive integer.

13. A vibration type brushless motor comprising:

a rotor composed of a rotor yoke, a ring magnet fixed to the rotor yoke and a shaft, wherein one end of the shaft is fixed to a center of rotation of the rotor yoke and another end of the shaft is held by a bearing member so as to rotate freely; and

a core having a plurality of salient poles arranged in a ring around the bearing member,

the ring magnet having an inner hole and facing the core having the plurality of salient poles, wherein a center of the inner hole coincides with the center of rotation of the rotor yoke, and wherein a center of the outer circumference of the ring magnet is shifted from the center of rotation of the rotor yoke by a predetermined shifting distance,

the vibration type brushless motor is further characterized in that vibration is generated by unbalanced vibration of the rotor.

14. A vibration type brushless motor comprising:

a rotor composed of a rotor yoke, a ring magnet fixed to the rotor yoke and a shaft, wherein one end of the shaft is fixed to a center of rotation of the rotor yoke and another end of the shaft is held by a bearing member so as to rotate freely; and

a core having a plurality of salient poles arranged in a ring around the bearing member,

the ring magnet having an inner hole and facing the core having the plurality of salient poles, wherein both a center of the inner hole and a center of an outer circumference of the ring magnet coincide with the center of rotation of the rotor yoke within a range of approximately 0 to 180 degrees in the mechanical angle with centering the center of rotation of the rotor yoke, and wherein the center of the inner hole coincides with the center of rotation of the rotor yoke within a range of approximately 180 to 360 degrees in the mechanical angle, and wherein the center of the outer circumference of the ring magnet

is shifted from the center of rotation of the rotor yoke by a predetermined shifting distance within a range of approximately 180 to 360 degrees in the mechanical angle,

the vibration type brushless motor is further characterized in that vibration is generated by unbalanced vibration of the rotor.

15. A vibration type brushless motor comprising:

a rotor composed of a rotor yoke, a magnet in disc shape fixed to the rotor yoke and a shaft, wherein one end of the shaft is fixed to a center of rotation of the rotor yoke and another end of the shaft is held by a bearing member so as to rotate freely; and

a plurality of air-core coils arranged in a ring around the bearing member,

the magnet having an inner hole, wherein a center of the inner hole coincides with the center of rotation of the rotor yoke, and wherein a center of an outer circumference of the magnet is shifted from the center of rotation of the rotor yoke by a predetermined shifting distance,

the vibration type brushless motor is further characterized in that vibration is generated by unbalanced vibration of the rotor.

16. A vibration type brushless motor comprising:

a rotor composed of a rotor yoke, a magnet in disc shape fixed to the rotor yoke and a shaft, wherein one end of the shaft is fixed to a center of rotation of the rotor yoke and another end of the shaft is held by a bearing member so as to rotate freely; and

a plurality of air-core coils arranged in a ring around the bearing member,

the ring magnet having an inner hole, wherein both a center of the inner hole and a center of an outer circumference of the ring magnet coincide with the center of rotation of the rotor yoke within a range of approximately 0 to 180 degrees in the mechanical angle with centering the center of rotation of the rotor yoke, and wherein the center of the inner hole coincides with the center of rotation of the rotor yoke within a range of approximately 180 to 360 degrees in the mechanical angle, and wherein the center of the outer circumference of the ring magnet is shifted from the center of rotation of the rotor yoke by a predetermined shifting distance within a range of approximately 180 to 360 degrees in the mechanical angle,

the vibration type brushless motor is further characterized in that vibration is generated by unbalanced vibration of the rotor.